GUIDE TO EROSION AND SEDIMENT CONTROL PRACTICES

Revised January 2007

Guide to Erosion and Sediment Control Practices

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Sequencing of Best Management Practices

The following is the general order in which BMPs should be considered. Each site is unique and the phasing of the project is up to the owner/operator therefore, the owner/operator is responsible for providing adequate protection during every phase of construction.

1. **Inlet Protection**- Check to see that the curb inlets and/or rear yard inlets, that receive water from your lot, are protected. This protection should be in place immediately following the installation of the inlets to prevent sediment from accumulating in storm system during construction.

    a. In new developments inlet protection should be provided as soon as the underground installation of storm sewer is complete. This is the responsibility of the City's contractor for public infrastructure. Contact the City of Fargo Engineering Department (241-1545) if this protection has not been provided.

    b. In private developments inlet protection should have been provided by the developer as soon as the underground installation of storm sewer is complete.

    c. If you are building in an established neighborhood providing inlet protection is the owner/operator's responsibility.

2. **Preservation of existing vegetation & grass buffers**- Grass or vegetation (including recently seeded areas) present at the curb line and/or in the rear yard surrounding inlets is considered a BMP. **Temporary fencing may be needed to protect these areas.** It is up to the owner/operator to make that determination based on their ability to keep employees and subcontractors from disturbing these areas. Materials may not be stored on grass buffers in the right of way. Under no circumstances will back cutting behind the curb be considered a BMP for storm water management.

    a. In new developments, at the completion of the paving project the City of Fargo shall have the boulevard areas backfilled, seeded with temporary seed, and mulched. Contact the City of Fargo Engineering Department (241-1545) if this has not been completed.

    b. If building in a private development the erosion and sediment control plan created by the developer should identify locations of any vegetation to be preserved and grass buffer strips. The owner/operator of the individual lot will need to determine if measures provided by the developer are adequate, or if further action is needed by the owner/operator or developer.

    c. If building in an established neighborhood the owner/operator of the site must provide a grass buffer by preserving existing vegetation, and seeding, or sodding any disturbed areas.

3. **Protection of Adjacent Lots**- Install perimeter BMPs (silt fence, fiber rolls, straw bales) along the common lot lines when the following conditions are met:

    a. The adjacent lot receives water from the site under construction.

    b. The adjacent lot has been seeded or sodded.

4. **Grading/Excavating**- BMPs are to be installed prior to grading or excavating. Before the site is disturbed be sure measures have been taken to prevent sediment transfer.

5. **Temporary Construction Entrance-** This entrance shall be crushed rock, crushed concrete, or wood chips. The temporary construction entrance shall be used by all contractors, subcontractors, and for all delivery personnel entering the site. **A temporary construction entrance is required.** (see details in this document)

6. **Stripping/Stockpiling- Preserve grass buffer strips during stripping and stockpiling.** Take special care when stripping and stockpiling the topsoil from the lot to avoid disturbing the grass buffer strips (may need to provide fencing of grass buffer strip areas, prior to stripping and stockpiling). Install BMPs to stabilize stockpiles. Silt fence, fiber rolls, or straw bales are acceptable interim measures. Seeding the piles is recommended if they will not be used for a period of 21 days or longer.

7. **Sewer/ Water connections-** When excavating for the sewer and water connections, the grass buffer strip may be unavoidably disturbed. **The grass buffer strip must be restored**. Interim measures may need to be installed in the area disturbed until vegetation is reestablished. Silt fence, mulch, or fiber rolls are acceptable interim measures.

8. **Dewatering-** Excavated trenches, basements, or foundation walls must be dewatered in a manner that protects the storm sewer system from sediments. **Discharging pumped water directly into the Storm Sewer System is not allowed and is grounds for the issuance of a stop work order on the site.** The use of dewatering structures, or filter bags is an appropriate. (see details in this document)

9. **Backfill and Rough Grading-** Grass buffer strips shall be preserved during the backfilling of the foundation and the rough grading process. Grass buffers may need to be fenced during this process to facilitate preservation.

10. **Maintenance- it is the responsibility of the owner/operator to provide maintenance of all BMPs on site until the project is complete or the lot is finally stabilized.**

11. **Final Grading/Seeding or Sodding-** in place BMPs will need to be removed to achieve final grading; this should be done to coincide with seeding and sodding of the lot. During the final grading, placing soil on the street must be avoided. The boulevard along the curb must receive one of the following treatments within five (5) days if it is disturbed during the final grading:

    a. Sod

    b. Seed with sprayed fiber mulch or anchored straw mulch

    c. Installation of BMPs (silt fence, fiber rolls, etc).

1. The owner/operator is responsible for making certain that BMPs are in place and functioning properly for the duration of construction.

2. Periodic inspections shall be a performed by the owner/operator at least once every 14 days, and within 24 hours of rainfall or snow melt resulting in runoff (.5 in or more in a 24 hour period), to be reasonably sure that BMPs are functioning as intended. Any problems noted during these inspections should be corrected within 48 hours. A log of the inspections and a detailed description of any measures undertaken to correct identified problems must be kept for future reference.

3. Once construction has begun, the owner/operator is responsible for maintenance of erosion and sediment control measures protecting inlets on the site (rear yard inlets). For Street inlets refer to the following:

    a. In new developments where the paving construction has not been completed at the time that private construction takes place the city shall transfer responsibility of storm water management to the developer including maintenance of inlet protection devices.

    b. In new developments (paving complete) and/or private developments: Inlets in the street remain the responsibility of the developer until such time as the development has reached a reasonable degree of final stabilization (to be determined by the City of Fargo Engineering Department).

    c. Upon final stabilization by the developer and/or in established neighborhoods: the owner/operator of the individual lot is responsible for the maintenance of any street inlets that accept runoff from the site under construction.

4. The owner/operator is responsible for making sure that the temporary construction entrance is put in place and that all employee, delivery, and or construction vehicles use this entrance and do not disturb the grass buffer strips along the curb line.

5. For the duration of the project, the owner/operator is responsible for making sure that that mud, dirt, rocks, and other debris are not transported by any means onto city streets or sidewalks. Should any materials be tracked or eroded onto the street, the contractor shall take steps to have it removed **before the end of the work day**.

Maintenance

Inspect sediment fences, fiber rolls, and inlet protection devices at least once every 14 days and within 24 hours of rainfall or snow melt resulting in runoff (.5 in or more in a 24 hour period), Make any necessary repairs within 48 hours.

Ineffective sediment fence, fiber rolls, rock logs, and inlet protection devices (decomposed, torn, collapsed materials) must be replaced.

When the sediments reach 1/3 the height of the fence or fiber rolls, carefully remove the accumulated sediments.

Inlet protection devices also require maintenance. **During each inspection if sediment is present in the devices it needs to be removed.**

Erosion and Sediment Control Inspections

City inspectors will inspect erosion and sediment control measures in conjunction with routine building inspections. Inspectors will make observations to determine that appropriate erosion and sediment control measures are in place, are properly installed, and are properly maintained.

During any inspection of the erosion and sediment control measures, if BMPs are not installed, are improperly installed, or are poorly maintained the inspector shall issue a "Notice of Violation Order to Correct". The owner/operator shall be instructed to correct the deficiency within 48 hours. The Inspections Department shall forward a copy of the "Notice of violation order to Correct" to the storm sewer utility staff. Storm sewer utility staff shall perform follow up inspections. **Once the contractor has corrected the deficiency they shall call the City of Fargo Engineering Department (701-241-1545) to request a re-inspection of their erosion and sediment control measures.** If the corrections are made and a re-inspection occurs within 48 hours the re-inspection fees may be waived provided the site is in compliance. After the 48 hour period has expired an inspection may be conducted by the city at any time. Should this re-inspection determine that the site is in compliance the site will be assessed a re-inspection fees of $60.00 per hour with a half hour minimum charge. Should this re-inspection of the site determine that compliance has not been achieved; the site shall be subject to an administrative citation and corresponding fees ($500.00 per occurrence).

In addition, during any inspection should sediments be found to be eroding off of the construction site due to missing or ineffective BMPs, the inspector may issue a stop work order until the sediments have been removed and the proper BMPs are established.

Each owner/operator must consider the unique circumstances of their site and do what is necessary to prevent a discharge. However, all inspections will evaluate the following common BMPs:

- Grass Buffer Strips
- Inlet Protection
- Grading and Excavating – BMPs in place
- Stabilize Soil Stockpiles or protect with temporary BMPs
- Temporary Construction Entrance

By the plumbing rough in inspection all BMPs should be in place (with the exception of seed and/or sod). At all subsequent requested inspections the in-place BMPs will be subject to re-inspection. If BMPs are not installed or are improperly installed, the erosion and sediment control inspection shall result in a notice of violation or an administrative citation.

City of Fargo Storm Sewer Utility Staff will be available to discuss erosion and sediment control measures for any lot and the sequencing for the installation. If you have questions call (701) 241-1545 to speak with Storm Sewer Utility Staff.

Temporary Construction Entrance

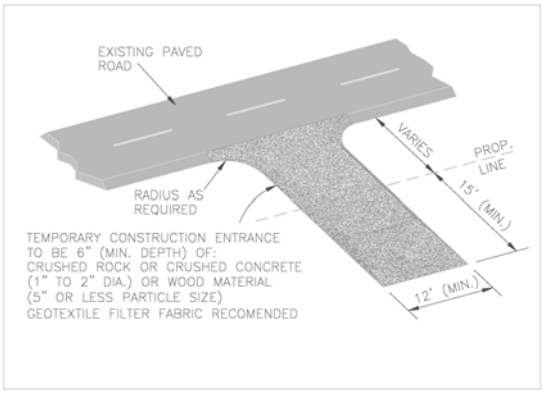
Each lot must have a temporary construction entrance if the permanent access is not in place. The purpose is to minimize tracking of sediments on to the street. It is the site operator's responsibility to see that all deliveries and construction equipment use this entrance.

The temporary construction entrance should be crushed rock, wood chips, or crushed concrete.

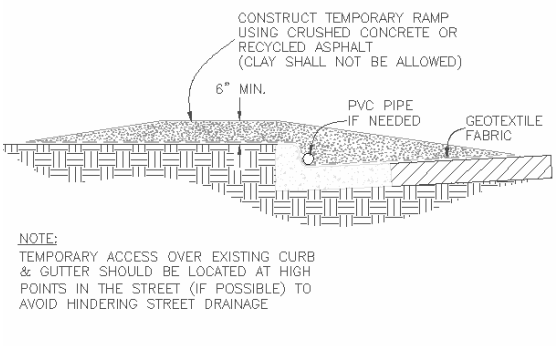
Wood material used for temporary construction accesses shall consist of "Coarse" grade material. Material shall consist of shredded bark of wood ground so that 95% of the material passes through a 5-inch sieve and no more than 45% through a ¾" sieve. Wood shall not contain material that would be harmful to equipment nor shall it contain compounds in quantities detrimental to animals, plant life or water quality. The material will have a dry bulk density of less than 22.2 lbs per cubic foot.

If the curb does not have a drop at the location of the temporary construction entrance a temporary ramp will be necessary. The ramp should be constructed of asphalt or crushed concrete.

Typical Temporary Construction Entrance



Temporary Access over Curb & Gutter



Best Access

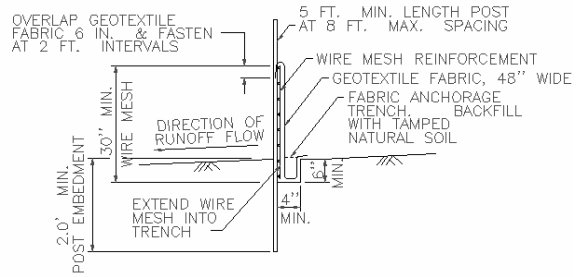
Better Access

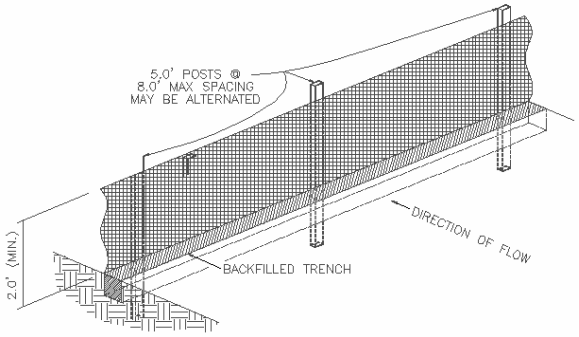
Non-compliant Access

Silt Fence and Fiber Rolls

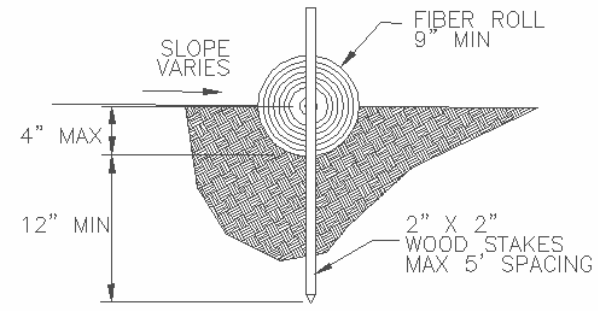
Silt fence can be used to protect stock piles or as a means of protection of your vegetated areas. The drawing below shows the typical heavy duty silt fence design that is often used for installations which will remain in place for the duration of a project. Posts may be installed in an alternating pattern if wind is a concern. This helps keep the fabric from tearing away from the posts due to strong winds in one direction.

Typical Silt Fence Details

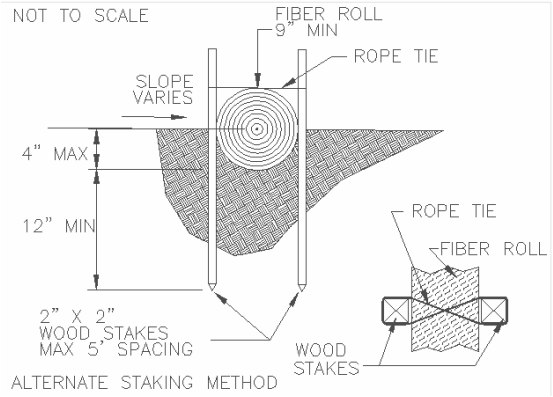




Typical Fiber Roll Details



NOT TO SCALE



Fiber rolls consist of straw or wood fiber contained in netting to form a log shape. They are 9"-20" in diameter. They must be secured with stakes. Typical installation requires that rolls be entrenched. It is important not to crush fiber roll when it is installed.

It is also important when installing either Silt fence or Fiber rolls to provide J-hooking.

Boulevard Re-vegetation

Reestablishing vegetation is a critical step to controlling erosion and sedimentation. Having vegetative cover such as temporary grasses reduces soil loss by at least 90% and can reduce losses by up to 97%, depending on the amount of cover and the species of grass planted. (For comparison, anchored hay applied at a rate of 1 ton per acre provides an 87% reduction.)

As you can see above the gutter section is clean adjacent to the grass buffer strip.

Typical silt fence installation with a grass buffer strip separating construction from final stabilization. Erosion has been minimized.

The photo below demonstrates both the need for establishing vegetation and the need to properly mulch.

There are many ways to re-establish vegetation. The quickest and most effective is to sod the disturbed area.

Seed sprayed with fiber mulch is also an effective way to quickly establish vegetation during the growing season. Fiber mulch is not appropriate for dormant seeding.

Seed can be applied with anchored (disked) straw mulch. The straw holds the soil in place until the seed germinates. Anchoring keeps the mulch from blowing away in strong winds.

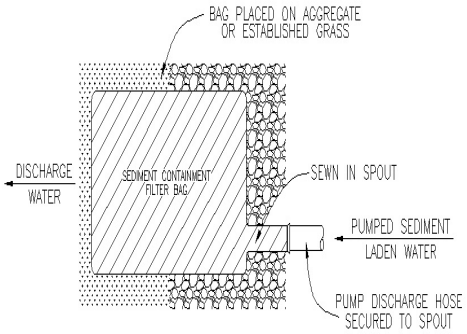
Construction Site Dewatering

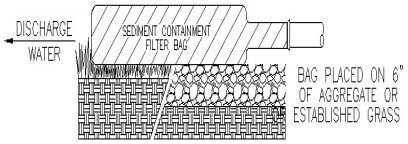
Removing excess water from a construction site is crucial to getting the job done. It is understood that it is not in anybody's best interest to wait for a site to dry out and pumping storm water may be necessary.

It is not however acceptable to discharge sediment laden water into inlets, curb lines, or anywhere else that they can come into contact with the storm sewer system or a natural water body.

Pumped sediment laden construction site water must be treated to eliminate the sediment before releasing the water. Treatment can be as simple as using a sediment containment bag (AS SHOWN BELOW). For smaller amounts of water a filter sock may be all that is necessary.

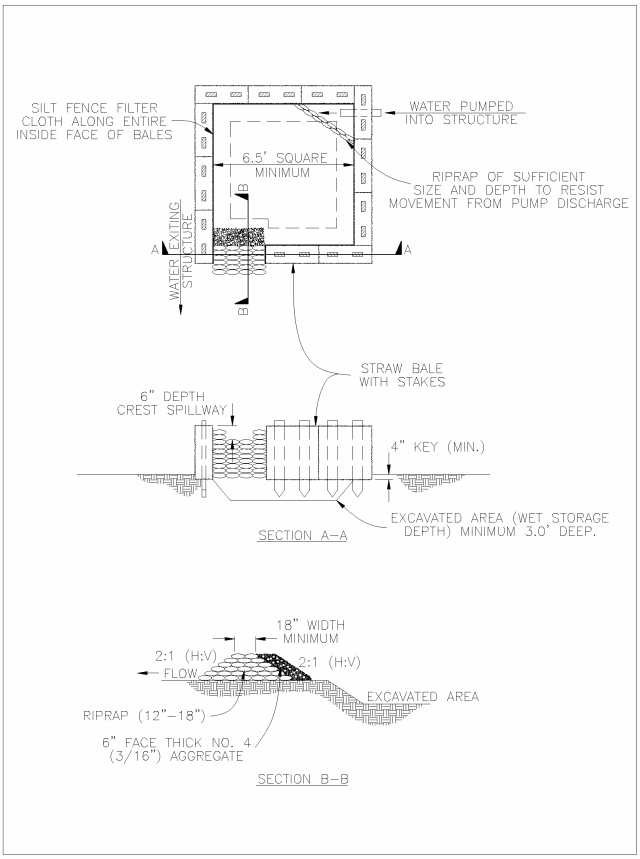
Sediment Containment Bag



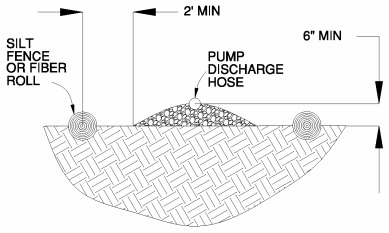


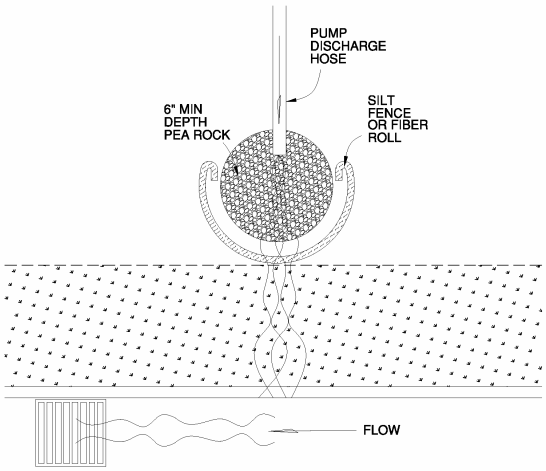
For larger amounts of water an operator may require a containment structure such as the one shown in the upper right. The intent of such a structure is to handle large amounts of pumped water and facilitate sediment removal. Structures must be sized appropriately for the pump or pumps total capacity. The lower right shows an alternative dewatering structure that can be constructed from materials most contractors have on hand. This structure is adequate for most situations.

Dewatering Structure



Alternative Dewatering Structure



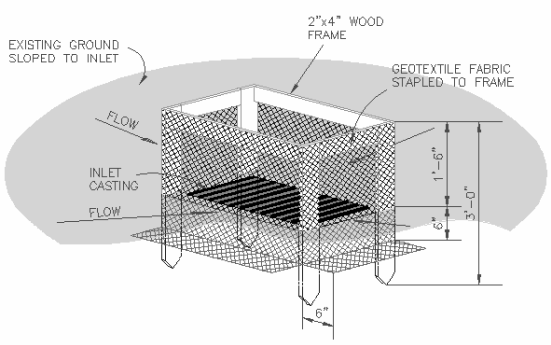


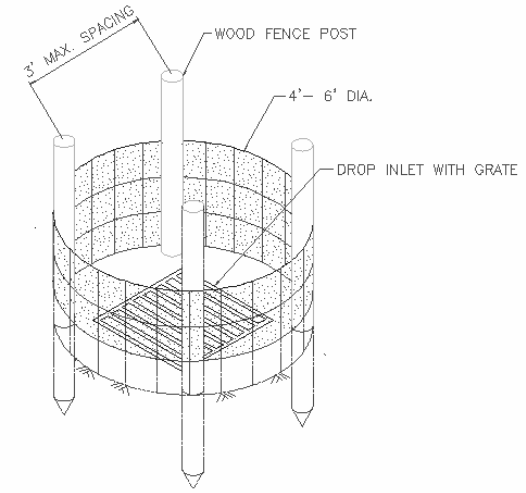
Curb and Inlet Protection

Inlet Protection Devices

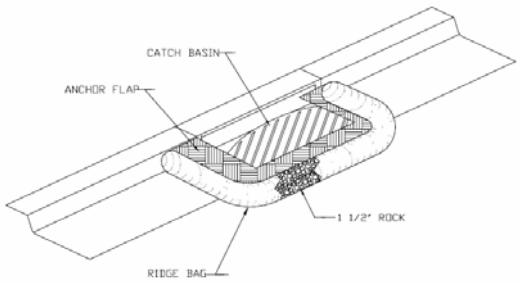
Inlet protection ranges from simple designs constructed with readily available materials to manufactured units that can be purchased and installed. Whatever the method the intent is the same…to keep sediment out of the inlet. Therefore, it is important to properly maintain devices of all kinds.

The following designs are easily constructed and utilize common materials: geotextile fabric and a 2" x 4" or wood fence post frame.

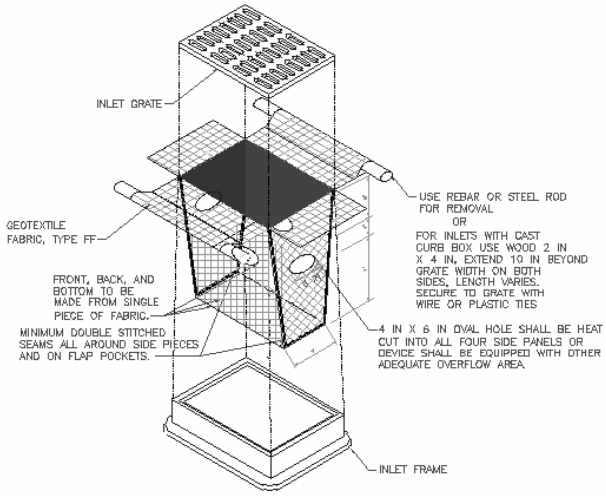




Rock Logs are products of varying length that can be filled with 1 ½" rock. They have a 6" anchoring flap which goes under the grate when installed.



Drop in Devices



Miscellaneous BMPs

In addition to the BMPs identified in this document there are very effective designs that utilize rock logs, sand bags, gravel and other readily available materials. Many such designs are promoted by the ND Department of Transportation, and the ND Department of Health- Division of Water Quality. When properly designed and installed these devices can serve as low cost BMPs. If the owner operator chooses to use such a device it is important to be sure that it is effective. If such a device does not perform additional measures need to be taken. Storm Sewer Utility staff is available to analyze the effectiveness of such devices. Please contact staff prior to installation.

Grass Buffer Strip Protection

Parking of vehicles, storage of materials, accessing the site at locations other than the temporary access provided, these are all ways in which the grass buffer strip may be compromised.

Loading and unloading equipment should be done using the temporary entrance not the street or the boulevard, to prevent unnecessary tracking

Vehicles should be parked on the street where it is allowed, or on the private lot.

Material Storage

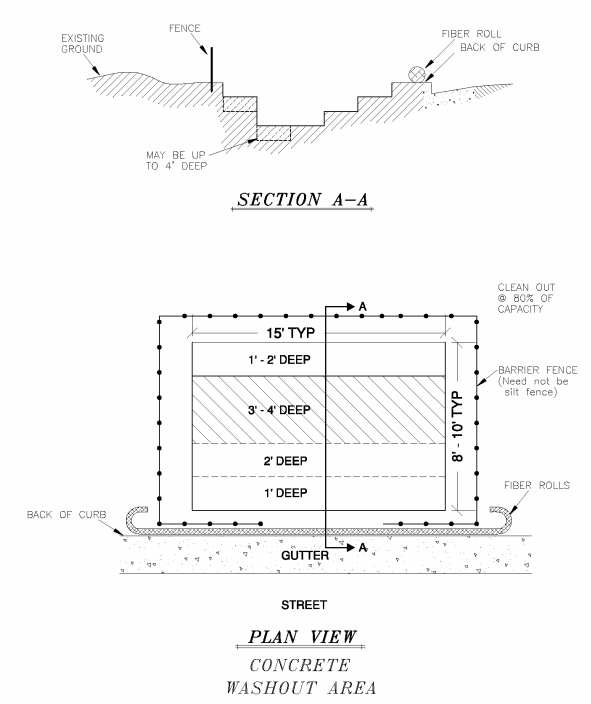
No materials are permitted to be stored in the right of way. They must be contained to the private lot.

The following are three (3) examples of improper material storage.

Concrete Truck Clean Out Areas

Concrete trucks may not be cleaned on the street. Should any material be discharged onto the street it must be removed by shoveling not by flushing. It is the responsibility of the operator of the site to be sure subcontractors are not in violation.

Concrete waste disposal



In new developments cleanout locations are provided. Such locations should be conspicuously signed.

Seasonal Considerations

Although Silt fence and devices such as the drop in or pop up inlet protection are effective for the management of sediment they can pose problems for practices such as snow removal. Therefore, it is recommended that such devices when located on the street side be removed by November 1st of each year. These devices or suitable alternates may need to be reinstalled in the spring to capture snowmelt runoff.

The owner/operator is still responsible to maintain effective control of sediment and other pollutants during the winter season therefore it is recommended that the following are considered:

- Halt land disturbing activities, until warm weather returns. Sequence work such that all land disturbing and earth moving activities take place prior to freeze up.
- Stabilize all exposed soil surfaces with vegetation, mulch, or erosion control cover before ground surface freezes. Seeding should occur prior to October 1st to provide time for germination and plant growth. Note that temporary seed may be used if final stabilization is not intended. Sod can be placed at any time and provides final stabilization; the difficulty may be finding a supplier outside of normal cutting season.
- Establish stable access point and stockpile gravel to maintain access during winter season.
- If new land disturbances need to occur, they must be stabilized immediately.
- Keep a stockpile of sandbags and other erosion control devices to manage situations that need immediate attention.

Pollution Prevention/Good Housekeeping

In the course of building a home it is necessary to use materials that could pose a threat to the quality of storm water. These significant materials include, but are not limited to, petroleum products, fertilizers, cleaning solvents, asphalt, concrete, adhesives, paints, joint compound, chemicals used to treat building materials, fertilizer, etc.

To reduce the potential for spills it is important to follow the Material Safety Data Sheets (MSDS) recommendation for handling, storage, and cleanup of all significant materials.

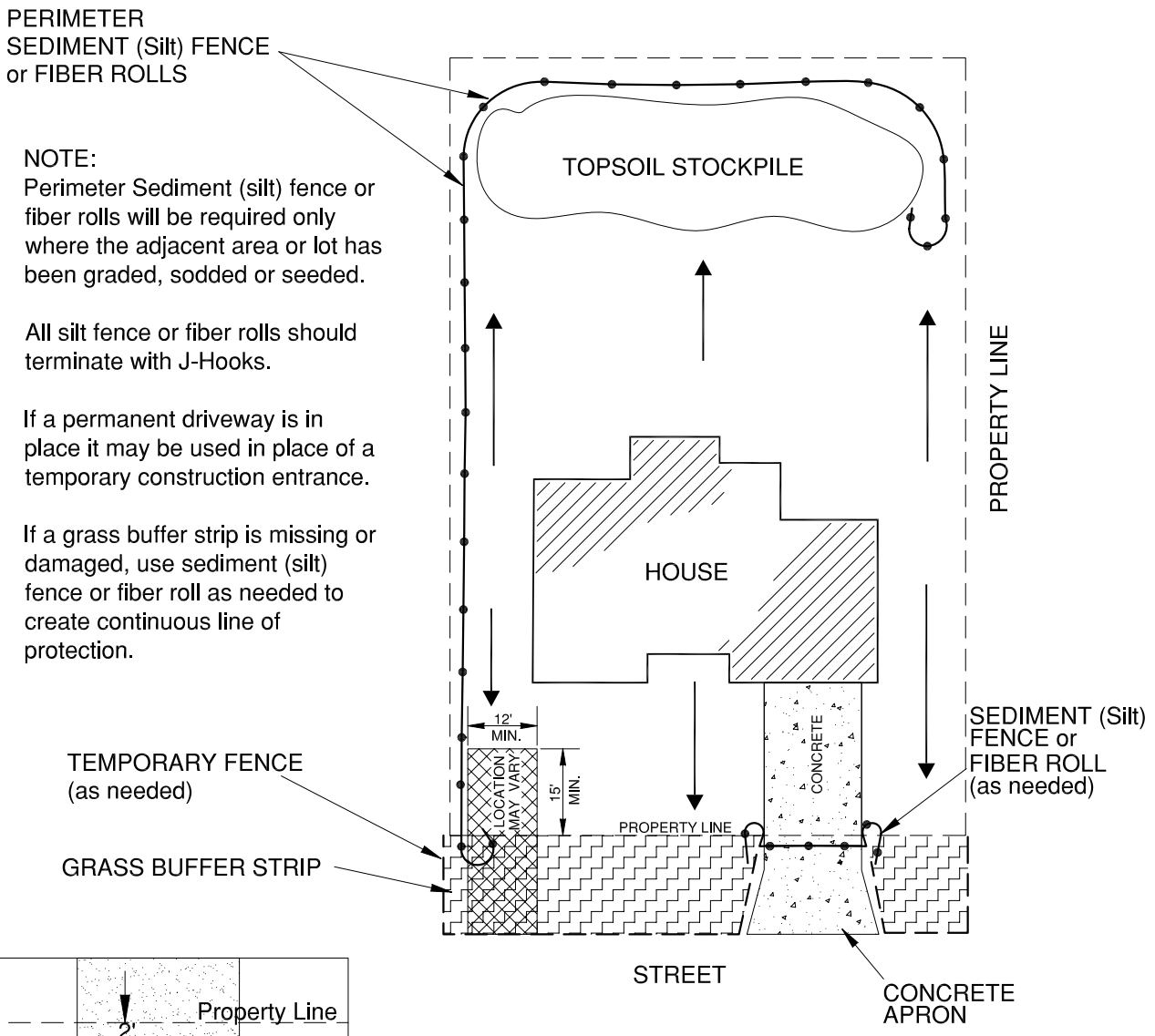
In addition the following BMPs can minimize or eliminate the risk of contamination of storm water.

1. Label all containers, cans, tanks, etc. properly identifying the contents.
2. Limit the amount of significant materials stored at the construction site.
3. Do not pour or deposit waste into storm drains or receiving waters.
4. Store containers inside secondary containment such as an enclosed trailer to protect against release during a storm event.
5. Restrict access to significant materials to avoid vandalism.
6. Clean up any spills immediately in an appropriate manner. Cover storm inlets or berm around them if a discharge is imminent.
7. Prepare a spill prevention response plan that identifies proper cleanup methods. Keep materials necessary to carry out plan (spill kits, absorbent) on site. Share this plan with employees.
8. Perform regular inspections and cleaning of storage areas.

Summary

Practical knowledge needs to be applied at each individual site to determine the most efficient way to protect the storm water system and the interests of the property owners and their contractors. The information contained in this document is meant to serve as a guide.

TYPICAL SINGLE FAMILY LOT EROSION CONTROL PLAN

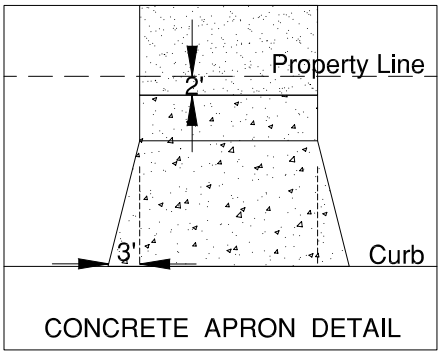


NOTE:
Perimeter Sediment (silt) fence or fiber rolls will be required only where the adjacent area or lot has been graded, sodded or seeded.

All silt fence or fiber rolls should terminate with J-Hooks.

If a permanent driveway is in place it may be used in place of a temporary construction entrance.

If a grass buffer strip is missing or damaged, use sediment (silt) fence or fiber roll as needed to create continuous line of protection.



CONCRETE APRON DETAIL

NOTE:
Temporary fence may be used to further protect the grass buffer strip.

Sediment (Silt) Fence or Fiber Rolls

Construction Entrance

Direction of Surface Water Runoff

Grass Buffer Strip

Temporary Fence

Property Line

REV,D. December 2006	
TYPICAL EROSION CONTROL PLAN	
CITY OF FARGO ENGINEERING DEPARTMENT	
APPROVED	DATE